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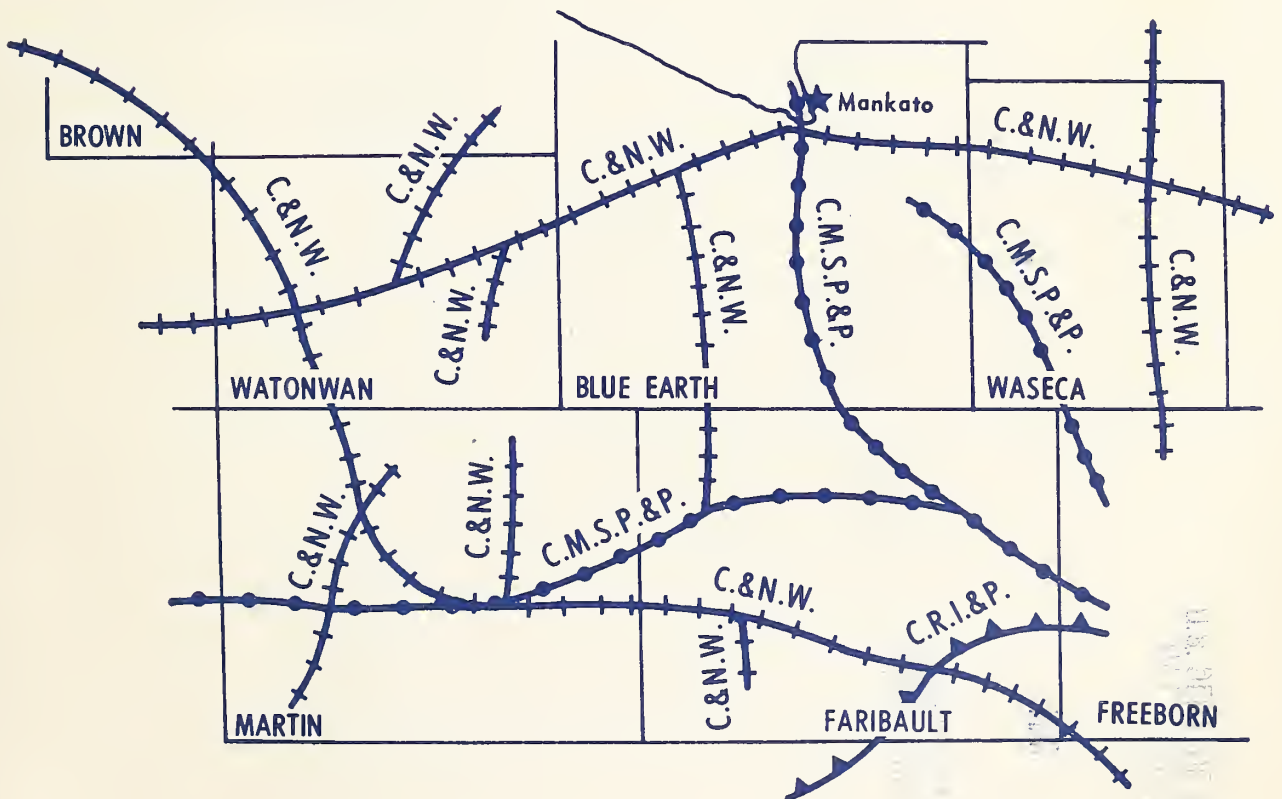
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Reserve

Guides to Improve Grain Handling And Transportation

Southcentral Minnesota



FARMER COOPERATIVE SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Farmer Cooperative Service provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

The Service (1) helps farmers and other rural residents obtain supplies and services at lower cost and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs.

The Service publishes research and educational materials and issues *News for Farmer Cooperatives*. All programs and activities are conducted on a nondiscriminatory basis, without regard to race, creed, color, sex, or national origin.

CONTENTS

The problem.....	iii
Findings.....	iv
Introduction--Area grain production.....	1
Present cooperative operations.....	2
Elevator numbers and capacities.....	2
Grain shipments.....	3
Pollution and safety regulations.....	4
Directions for improvement.....	5
Elevator construction.....	5
New central elevator.....	7
Elevator modernization.....	8
Transportation.....	10
Organization.....	12
Appendix.....	14
Table 1--Production and off-farm sales of corn.....	15
Table 2--Production and off-farm sales of soybeans.....	15
Table 3--Projected 1975 off-farm sales density of corn and soybeans.....	16
Table 4--Average balance sheet of 14 cooperatives.....	16
Table 5--Average operating statement of 14 cooperatives.....	17
Table 6--Area elevator numbers and storage capacity.....	18
Table 7--Storage capacity and rate of turnover of 14 cooperatives..	18
Table 8--Off-farm sales, storage capacity, and turnover by counties.....	19

Table 9--Percent of grain received by months.....	19
Table 10--Grain destinations.....	20
Table 11--Grain shipments by months.....	21
Table 12--Model A and B elevator operating expenses.....	22
Table 13--Model A income and loan repayment ability.....	23
Table 14--Model B income and loan repayment ability.....	23
Table 15--Model Y and Z elevator operating expenses.....	24
Table 16--Model Y income and loan repayment ability.....	25
Table 17--Model Z income and loan repayment ability.....	25
Table 18--Added facilities operating expenses.....	26
Table 19--Income and loan repayment ability for added storage facilities with 25-car rail siding	27
Table 20--Income and loan repayment ability for added storage facilities with 50-car rail siding.....	27

THE PROBLEM

Fourteen cooperatives in south central Minnesota face a changing grain marketing environment.^{1/} Each year an increasing amount of grain is moving to distant markets. Yet elevators, largely built prior to the 1960s, were designed to serve local markets. The changing market has called for increased storage, better handling facilities, and more drying capacity. A new dimension has been the need to move grain in large-volume units by rail, primarily to the Gulf for export. Decisions need to be made to determine how to best react to the changing demands of the market. Essentially, the decision was to improve present elevators or build new ones.

The purpose of this study is to determine which of the following alternatives the cooperatives should follow:

1. Continue as at present.
2. Add additional grain storage and improve handling facilities to meet the needs of individual cooperatives.
3. Jointly build and operate one or more larger centralized, fast-handling elevators capable of loading 25- and 50-car unit-trains.
4. Expand and modernize one or several elevators on main rail lines to permit rapid loading of unit-trains and use remaining elevators for truck shipments and as satellites to primary elevators.

^{1/} FCS is indebted to the 14 cooperatives for their cooperation in providing information necessary to reach conclusions. The authors are grateful for Mary Teymourian's help in developing the statistical portion of the manuscript.

FINDINGS

1. Increasing off-farm grain sales to distant markets require larger, faster handling and shipping facilities.
2. An increasing amount of farm storage is being built.
3. Unit-train shipments provide a competitive advantage and are becoming an increasingly important factor in profitable grain marketing.
4. Barge shipments will continue as an important transportation alternative.
5. The least-cost method for cooperatives to meet unit-train shipping requirements is to expand and modernize elevators strategically situated along main rail lines.
6. Cooperatives deciding to ship 25- and 50-car unit-trains must gear market strategy to the export market.
7. Cooperatives off main rail lines should make fee-shipping arrangements with those on main lines to gain the benefits of unit-train marketing.
8. Trucks still will be utilized to ship grain primarily to nearby markets.

Improving grain marketing in South Central Minnesota requires that cooperatives work together to build unit-train origination capability.

Organizational alternatives are merger, fee-handling, or a federated sales and handling agency.

We recommend merger in most cases because (1) it centralizes control and management, which should reduce personnel and administrative cost; and (2) it offers superior opportunities to improve grain handling efficiency.

GUIDES TO IMPROVE GRAIN HANDLING AND TRANSPORTATION

South Central Minnesota

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INTRODUCTION--AREA GRAIN PRODUCTION

Corn and soybeans account for most of the grain produced in this south central Minnesota study area--more than 135 million bushels in 1973. Facility requirements for the 14 cooperatives involved are necessarily oriented to these crops. The cooperatives operate in seven counties--Blue Earth, Brown, Faribault, Freeborn, Martin, Waseca, and Watonwan.

Production of corn and soybeans is increasing (tables 1 and 2, appendix page 15). Off-farm sales for corn in 1975 are projected to be 8 percent greater than for 1972 and 16 percent greater by 1980. From the same base year, soybean off-farm sales are projected to be 19 percent greater by 1975 and 46 percent greater by 1980. Fifty percent of corn production and 97 percent of soybean production are moving off-farm.

Off-farm grain sales density within an area is critical to determining drawing area required to supply a fast-handling elevator loading unit-trains.

Table 3, appendix page 16, presents five radii blocks from any given point in the study area, ranging from a radius of 0-5 miles to 20-25 miles. Table 3 also shows that projected off-farm grain sales in 1975 for any 10-mile radius within south central Minnesota are 5,830,000 bushels.

In 1972, about 70,990,000 bushels of the 118,608,000 bushels of total production were sold off-farm. Farm storage in the seven counties for 1972 was 94,680,000 bushels. Storage broken down by counties was:

Blue Earth	13,440,000 bu.
Brown	19,800,000
Faribault	10,680,000
Freeborn	13,200,000
Martin	19,200,000
Waseca	12,000,000
Watsonwan	6,360,000

PRESENT COOPERATIVE OPERATIONS

Membership of the 14 cooperatives ranges from 144 to 1,450. Members total 7,000, or an average of 500 per cooperative.

Combined assets are \$18,632,500, or an average of \$1,330,900. Working capital averaged \$164,650, with a ratio of current assets to current liabilities of 1.27 (table 4, appendix page 16).

Operating statements of the 14 cooperatives take into account grain sales and farm supply business. In 1972-73, combined sales were \$49,968,000, or an average of \$3,569,000. Average net savings were \$92,480, or 2.6 percent of gross sales (table 5, appendix page 17).

Elevator Numbers and Capacities

Best available information indicates the 7 county area has 112 elevators. Combined storage capacity is 43,126,000 bushels, or an average of 385,100 bushels (table 6, appendix page 18). These capacity figures include those for some processors and terminal elevators.

The 14 study cooperatives operate 17 elevators with an average capacity of 603,800 bushels. Grain sales in 1972 were 21,777,000 bushels. Fifty-seven percent of capacity was upright; the remaining, flat storage (table 7, appendix page 18).

Comparison of off-farm grain sales with total storage capacity for all elevators in the 7 county area reveals the turnover to be 1.6 times (table 8, appendix page 19). It varies by county. Elevators of the study cooperatives showed a 2.1 turnover.

Co-op managers estimate that 82 percent of the corn and 83 percent of the soybeans they receive come from within a 10-mile radius. From this area, the average cooperative received 1,350,000 bushels of corn and soybeans.

Farmers haul grain to the elevator in truckloads averaging 292 bushels and wagonloads averaging 160 bushels.

Most grain is received at harvest. Twelve cooperatives reporting for 1972 received 46 percent of their grain in October and November (table 9, appendix page 19). July was next highest in receipts with 11 percent. Other months show a grain receiving rate from 3 to 8 percent.

Grain Shipments

Since crop year 1970-71, shipping patterns have changed significantly, Table 10, appendix page 20, lists grain shipments for the crop years 1970-71, 1971-72, and 1972-73. From the 1971 to the 1973 crop year, truck shipments increased from 65 percent to 75 percent of total grain shipped. Savage, a barge-loading point, is a principal destination and is served mainly by truck. Rail deliveries to Savage declined sharply. Corn and soybeans going

by rail to Savage in 1970-71 were more than 450,000 bushels; in 1971-72, more than 260,000 bushels; and in 1972-73, less than 150,000 bushels.

Rail shipments to or through Minneapolis-St. Paul dropped by half, from 3.4 million bushels in 1970-71 to 1.7 million bushels in 1972-73.

The 11 cooperatives reported no direct rail shipments to the Gulf in 1970-71. But shipments to the Gulf in 1971-72 were 127,000 bushels and ballooned to 670,000 bushels in 1972-73. Corn and soybeans were shipped in about equal amounts. A major part of rail movement shown in table 10 as Minneapolis-St. Paul actually moved to Duluth-Superior for export.

Monthly grain shipments have been more uniform than receipts. In 1972, receipts exceeded shipments only in the 2 harvest months of October and November. Though shipments were heaviest in the harvest months, they were almost as high in August and September (table 11, appendix page 21).

Soybeans and corn had different shipping patterns in 1972. Soybeans were shipped heavily at harvest and then more or less uniformly the rest of the year. Corn shipments were heaviest at harvest, light from January through May, and then heavier June through September.

About half of the corn received was dried. Amount varied considerably from one elevator to another. One cooperative dried 20 percent while another dried more than 70 percent.

Pollution and Safety Regulations

Ten cooperatives have made changes since 1970 to comply with the Occupational Safety and Health Administration standards. Man-lift improvements were most common. Several cooperatives improved fire extinguishers and added safety equipment. Total OSHA-related costs were \$18,000.

Three cooperatives have indicated changes to meet pollution requirements. Expenditures were to equip a new elevator and to purchase an approved dryer. Though costs are hard to accurately estimate, they did represent an addition to total cost.

Four cooperatives indicated future changes are planned to meet pollution and safety requirements. Currently, none of the 14 cooperatives appears to have significant problems in meeting pollution and safety regulations.

DIRECTIONS FOR IMPROVEMENT

Findings and recommendations of this study are limited to grain marketing and transportation. Several of the cooperatives have substantial farm supply operations. It is entirely possible that a cooperative not in a good location for grain transportation and marketing may be well situated to distribute farm supplies. This farm supply factor would need to be weighed in any consideration of location or relocation of cooperative facilities.

Elevator Construction

Elevator costs are affected by the kind and size of elevator, location, length of loan, interest rate, and so on. In this study, costs were determined by comparing two different sizes of new elevators and adding storage to existing elevators. Costs of these alternatives are:

\$496,000 for a 300,000-bushel new elevator.

\$624,000 for a 500,000-bushel new elevator.

\$215,000 for a 300,000-bushel annex to an existing elevator.

Costs, obtained from Minnesota and Iowa contractors, include the elevator, land, dryers, and other necessary equipment for a fast-handling elevator.

Elevators were designed to load 25 or 50 rail cars in 24 hours and to reflect operating conditions under two different margins and handling three different grain volumes. Each facility was designed to load for rail or truck shipping and to receive by truck.

It is anticipated that facilities would be operated at least one shift a day or more, depending on the peak grain movement period. Elevator construction would be turnkey jobs, except those projects where added facilities would utilize existing elevator headhouse receiving and loading equipment.

Suggested model facilities have been broken into components so any portion could be used to upgrade existing facilities. Following are calculated costs for grain facility alternatives:

Model A--300,000-bushel concrete elevator costing \$496,000 and rail siding for 25 cars costing \$90,000, with 10-year loan retirement.

Model B--300,000-bushel concrete elevator costing \$496,000 and rail siding for 50 cars costing \$165,000, with 10-year loan retirement.

Model Y--500,000-bushel concrete elevator costing \$624,000 and rail siding for 25 cars costing \$90,000, with 10-year loan retirement.

Model Z--500,000-bushel concrete elevator costing \$624,000 and rail siding for 50 cars costing \$165,000, with 10-year loan retirement.

Added facilities--300,000-bushel concrete annex costing \$215,000 and rail siding for 25 cars costing \$90,000, with 10-year loan retirement.

Added facilities--300,000-bushel concrete annex costing \$215,000 and rail siding for 50 cars costing \$165,000, with 10-year loan retirement.

Operating costs for the first year for each facility are based on a merchandising margin of 5 and 7 cents on grain volume handled. Drying income varies by volume. Other income is estimated for refunds from railroads to offset added costs for trackage.

New Central Elevator

Tables 12, 13, and 14, appendix pages 22 and 23, project expenses, income, and savings (or loss) for Models A and B during the first year's operation. Tables 15, 16, and 17, appendix pages 24 and 25, project expenses, income and savings (or loss) for Models Y and Z during the first year's operation.

Cost and expense items are based on information from the 14 cooperatives, from similar FCS studies, and other sources.

A summary of tables 13, 14, 16, and 17, indicates the potential payoff for a new central elevator with a 10-year loan. This payoff for the first year's operation depends on the following grain volume and margins for the type and size of elevator:

Model A--300,000-bushel elevator with 25-car rail siding

Volume handled	4.5 million bu.	3 million bu.
Margin per bushel	5¢	7¢
Net above loan repayment	\$57,000	\$32,700
Internal rate of return	30.0%	24.8%

Model B--300,000-bushel elevator with 50-car rail siding

Volume handled	4.5 million bu.	3 million bu.
Margin per bushel	5¢	7¢
Net above loan repayment	\$51,900	\$20,300
Internal rate of return	27.0%	22.3%

Model Y--500,000-bushel elevator with 25-car rail siding

Volume handled	4.5 million bu.	4.5 million bu.
Margin per bushel	5¢	7¢
Net above loan repayment	\$19,700	\$91,700
Internal rate of return	21.8%	34.9%

Model Z--500,000-bushel elevator with 50-car rail siding

Volume handled	4.5 million bu.	4.5 million bu.
Margin per bushel	5¢	7¢
Net above loan repayment	\$16,400	\$88,400
Internal rate of return	20.0%	32.2%

Internal rates of return indicated can be obtained only if the facilities are (1) on main rail lines; (2) get sufficient volume either from farmer members or other cooperatives; and (3) realize the stated grain margin.

Elevator Modernization

Tables 18, 19 and 20, appendix pages 26 and 27, detail expenses, income, and net savings (or loss) to add storage facilities to an existing elevator. In the proposed expansion, the existing elevator continues to receive and ship the grain. The added facilities are to accumulate grain for unit-train shipments.

The costs shown for added facilities cover only added storage and rail siding. It was assumed the present elevator had adequate receiving and shipping facilities to handle the added volume. In some cases handling facilities may need to be expanded at added cost. This would vary considerably among elevators.

Tables 19 and 20, appendix page 27 reveal the payout for the first year's operation at three volumes for a 300,000-bushel annex. Summarized:

300,000-bushel annex with 25-car rail siding at 5¢ margin

Volume handled	2.2 million bu.	3 million bu.	4.5 million bu.
Net above loan repayment	\$35,700	\$80,200	\$159,000

300,000-bushel annex with 25-car rail siding at 7¢ margin

Volume handled	2.2 million bu.	3 million bu.	4.5 million bu.
Net above loan repayment	\$70,900	\$128,200	\$231,000

300,000-bushel annex with 50-car rail siding at 5¢ margin

Volume handled	2.2 million bu.	3 million bu.	4.5 million bu.
Net above loan repayment	\$23,300	\$67,800	\$153,800

300,000-bushel annex with 50-car rail siding at 7¢ margin

Volume handled	2.2 million bu.	3 million bu.	4.5 million bu.
Net above loan repayment	\$58,500	\$115,800	\$225,800

Cost comparisons of new elevator construction and annex construction clearly indicate the advantages of upgrading and expanding present facilities. Existing facilities is the key, low-cost element that makes adding storage to an existing elevator the least-cost means to acquiring the capability of originating unit-train shipments. This is true whether the existing storage is at the elevator chosen for unit-train originations or at affiliated elevators that would funnel grain to the unit-train elevator.

Many of the cooperatives' facilities can be upgraded by adding trackage to handle 25 or 50 cars. Estimated construction and first-year's operating costs for railroad sidings are as follows:

	<u>25 rail cars</u>	<u>50 rail cars</u>
Length of siding (feet)	3,300	6,300
Cost	\$90,000	\$165,000
Interest (8½%)	\$7,425	\$13,612
Depreciation (5%)	\$4,500	\$8,250

A sizeable volume of grain must be shipped by unit-trains just to pay for the increased cost of trackage. Following is a tabulation to show several shipping schedules and per-bushel expenses for the first year's repayment for a 25-car track. These figures do not include refunds based on volume shipped that may be obtained from the railroad to apply to trackage costs.

<u>Annual 25-car shipments</u>		<u>: Cost of adding trackage for 25-car shipments</u>		
:		<u>Principal</u>	<u>First year</u>	<u>Total first</u>
<u>Number</u>	<u>Busbels</u>	<u>payment 1/</u>	<u>interest cost 2/</u>	<u>year expense</u>
<u>Cents per bushel</u>				
4	350,000	2.6	2.1	4.7
8	700,000	1.3	1.1	2.4
12	1,050,000	.9	.7	1.6
26	2,275,000	.4	.3	.7
52	4,550,000	.2	.2	.4

1/ Assumes a \$90,000 loan is repaid in equal yearly payments for 10 years.

2/ Calculated on first-year interest of 8½ percent on \$90,000 for trackage.

Upgrading costs vary according to the amount of trackage needed and the arrangement of the facilities in relation to track location. The railroad company serving a particular elevator can best determine the amount and cost of additional trackage.

Refunds from the railroad are generally based on the number of cars originated. Agreements with railroads vary widely on the amount and extent of refunds. One existing agreement illustrates how costs for additional trackage can be partly offset. The following figures are based on a \$25 per car refund by the railroad for cars shipped, up to 25 percent of the cost of track.

<u>Grain volume shipped</u> <u>1,000 bushels</u>	:	<u>Hopper cars shipped</u> <u>Number</u>	:	<u>Annual refund</u> <u>Dollars</u>
2,200		616		15,400
3,000		840		21,000
4,500		1,260		31,500

Transportation

Adequate transportation at competitive cost is an increasingly important factor in grain marketing. Main-line elevators capable of shipping 25-, 50-, and possibly 100-car unit-trains have a particular competitive advantage in export marketing.

All elevators of the 14 study cooperatives are on rail lines. The ability of those lines to accommodate loaded hopper cars or vulnerability to rail abandonment is indicated in figures 1 and 2. While the CMSP&P line from Wells to Fairmont was unable to accommodate gross car weight of over 263,000 pounds in August 1973, it is presently being upgraded to accommodate loaded hopper cars by the fall of 1974.

FIGURE 1

RAIL LINES CAPABLE OF CARRYING GROSS CAR WEIGHT OF OVER AND UNDER 263,000 POUNDS, AUGUST 1973

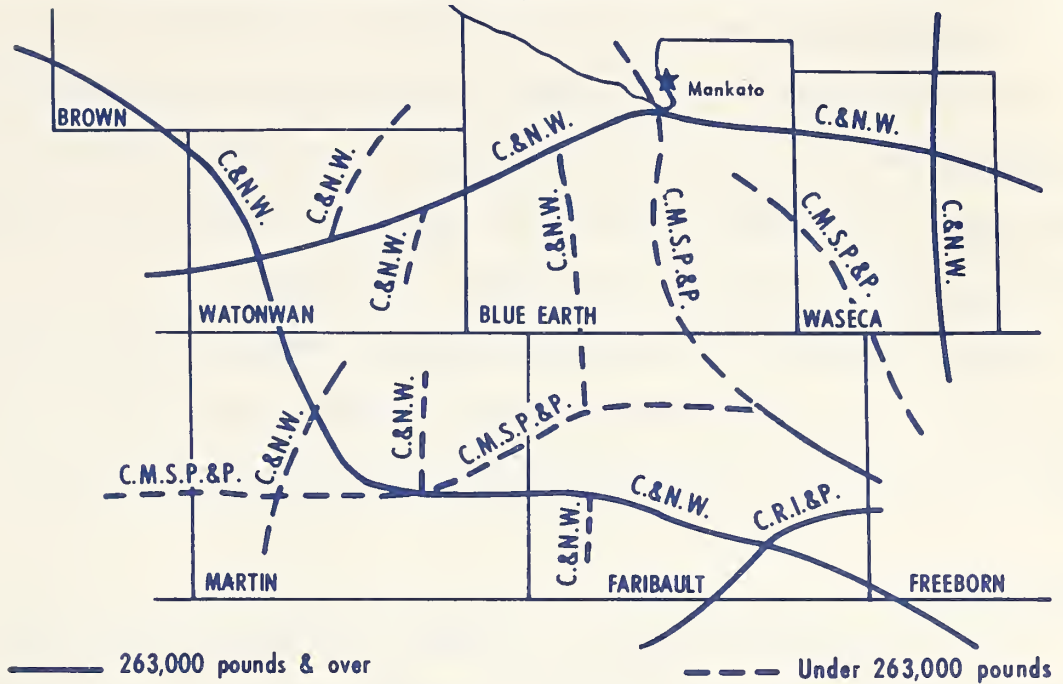
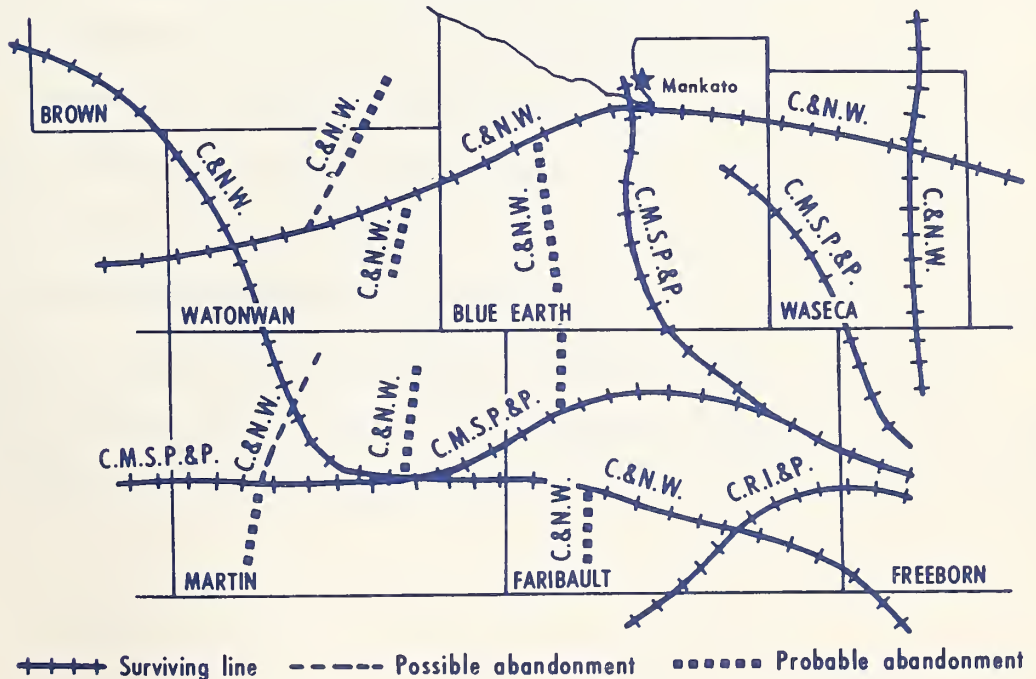


FIGURE 2

STATUS OF RAIL LINES SERVING SELECTED COUNTIES IN SOUTH CENTRAL MINNESOTA, 1973



SOURCE: BASED ON INFORMATION OBTAINED FROM INDIVIDUAL RAILROADS.

Cooperatives with elevators off main lines may find advantages in arranging with another cooperative on a main line to handle their grain for unit-train shipments.

One method would be for the cooperative with unit-train capability to schedule the 25 or 50 cars, then arrange for off-line elevators to deliver their grain. The loading elevator would be paid a loading fee. Off-line elevators would be responsible for weights and grades.

Another method would be for the cooperative with unit-train capacity to purchase grain outright from off-line elevators. Grain would be purchased on the basis of the 25- or 50-car unit-train loading elevator.

Organization

Whether cooperatives build new elevators or modernize and expand existing facilities to gain unit-train shipping capability, some system or organization seems necessary to handle administrative details. Alternatives include merger, fee handling, or federated sales and handling agencies.

Whatever the organizational method, it should be developed to fit the particular needs of the area served and the cooperatives involved.

Generally speaking, merger offers the greatest joint effort potential because it (1) centralizes control and management; and (2) facilitates adoption of programs to increase efficiency in marketing and handling grain.

Building new central elevators and modernizing existing elevators to gain unit-train shipping advantages may, however, increase grain handling costs. Each time grain passes through a facility, such as a local elevator,

then is transferred to another facility, a cost is incurred. From several sources, this cost is estimated at $3\frac{1}{2}$ to 4 cents a bushel. Additionally, costs must be considered for trucking grain from the local elevator to a central facility.

APPENDIX

Table 3 --Projected 1975 off-farm sales density for corn and soybeans, South Central Minnesota.

Radius (miles)	Type of grain		Total	
	Corn	Soybeans	Each radius	Cumla- tive
	1,000 bu.			
0 - 5	950	510	1,460	1,460
5 - 10	2,850	1,520	4,370	5,830
10 - 15	4,750	2,530	7,280	13,110
15 - 20	6,650	3,550	10,200	23,310
20 - 25	<u>8,550</u>	<u>4,560</u>	<u>13,110</u>	<u>36,420</u>
Total (0-25)	23,750	12,670	36,420	---

Table 4.--Average balance sheet of 14 selected cooperatives, South Central Minnesota, fiscal 1972-73

<u>Current assets</u>	
Cash	\$114,643
Accounts receivable	110,036
Inventory	463,471
Other current assets	<u>94,014</u>
Total	782,164
<u>Investments</u>	
	100,950
<u>Fixed assets (net)</u>	
	447,779
<u>Total assets</u>	
	<u>1,330,893</u>
<u>Current liabilities</u>	
Notes payable	172,436
Other liabilities	<u>445,086</u>
Total	617,522
<u>Long-term liabilities</u>	
	119,357
<u>Members' equity</u>	
Stock or membership <u>1/</u>	492,950
All other	<u>101,064</u>
Total	594,014
<u>Total liabilities & members' equity</u>	
	<u>1,330,893</u>
<u>Working capital</u>	
	\$164,642
<u>Ratio of current assets to current liabilities</u>	
	1.27

1/ Includes common and preferred stocks, share credits, and revolving funds.

Table 5--Average operating statement shown in dollars and as percent of gross sales, 14 selected cooperatives, South Central Minnesota, fiscal 1972-73

	<u>Dollars</u>	<u>Percent of sales</u>
Gross sales	3,569,150	100.0
Cost of sales	<u>3,315,071</u>	<u>92.9</u>
Gross margin	254,079	7.1
Other income	<u>106,957</u>	<u>3.0</u>
Gross margin and other income	361,036	10.1
Expenses	<u>268,550</u>	<u>7.5</u>
Net savings from operations	92,486	2.6

Table 6--Number and storage capacity of all elevators, selected counties, South Central Minnesota, 1973

County	14 cooperatives		All other cooperatives		Non-cooperative		Total	
	Elevators Number	Capacity 1,000 bushels	Elevators Number	Capacity 1,000 bushels	Elevators Number	Capacity 1,000 bushels	Elevators Number	Capacity 1,000 bushels
Blue Earth	1	725	10	4,671	15	4,674	26	10,070
Brown	2	625	3	1,627	9	3,573	14	5,825
Faribault	9	5,996	2	411	8	5,383	19	11,790
Freeborn	1	230	4	886	9	1,962	14	3,078
Martin	--	--	5	1,829	12	2,768	17	4,597
Waseca	--	--	2	339	9	3,085	11	3,424
Watonwan	<u>4</u>	<u>2,689</u>	<u>2</u>	<u>269</u>	<u>5</u>	<u>1,384</u>	<u>11</u>	<u>4,342</u>
Total	17	10,265	28	10,032	67	22,829	112	43,126

Table 7--Capacity of storage facilities by type, grain sales, and rate of turnover for 14 selected cooperatives by county, South Central Minnesota, 1972

County	Cooperatives Number	Type of storage capacity				Grain sales 1,000 bushels	Turn- over Times
		Total 1,000 bushels	Upright Percent	Flat 1,000 bushels	Percent		
Blue Earth	1	725	450	62	275	38	3.3
Brown	1	625	430	69	195	31	2.6
Faribault	9	5,996	3,035	51	2,961	49	2.0
Freeborn	1	230	69	30	161	70	2.9
Watonwan	<u>2</u>	<u>2,689</u>	<u>1,853</u>	69	<u>836</u>	31	<u>1.9</u>
5 counties	14	10,265	5,837	57	4,428	43	2.1

Table 8 --Estimated off-farm sales of corn and soybeans, storage capacity, and rate of turnover for 112 elevators, by counties, South Central Minnesota, 1972

County	Off-farm sales of corn and soybeans	Storage capacity	Turn- over
	-----1,000 bu.-----		Number
Blue Earth	12,170	10,070	1.2
Brown	8,640	5,825	1.5
Faribault	13,160	11,790	1.1
Freeborn	10,138	3,078	3.3
Martin	12,693	4,597	2.7
Waseca	6,269	3,424	1.8
Watsonwan	<u>7,920</u>	<u>4,342</u>	<u>1.8</u>
7 counties	70,990	43,126	1.6

Table 9 --Percent of grain received by months by 12 cooperatives in South Central Minnesota, 1972 crop

Month	Type of grain			Total grain
	Corn	Soybeans	Other	
	-----Percent-----			
January	3	3	3	3
February	3	6	8	4
March	2	7	10	4
April	2	5	5	3
May	4	5	6	4
June	7	6	9	7
July	13	7	14	11
August	11	2	29	8
September	8	2	6	6
October	20	48	1	28
November	24	4	2	18
December	<u>3</u>	<u>5</u>	<u>7</u>	<u>4</u>
	100	100	100	100

Table 10--Major destinations for corn, soybeans, and other grains by rail and truck from 11 cooperatives, South Central Minnesota, 1970-71, 1971-72, and 1972-73

Market	Grain	Year					
		1972-73		1971-72		1970-71 1/	
		Rail	Truck	Rail	Truck	Rail	Truck
-----Bushels-----							
Minnesota:							
Local sales	Corn	-	1,611,227	-	1,758,364	-	2,169,368
	Soybeans	-	11,584	-	9,617	-	8,155
	Other	-	124,223	-	88,324	-	119,663
		-	1,747,034	-	1,856,305	-	2,297,186
Mankato	Corn	-	22,674	4,030	10,931	-	
	Soybeans	574,216	2,374,459	455,962	2,006,788	555,424	1,755,824
	Other	-	10,192	-	21,096	13,705	42,216
		574,216	2,407,325	459,992	2,038,815	569,129	1,798,040
Savage	Corn	124,561	5,714,648	201,174	4,579,362	423,742	5,079,734
	Soybeans	23,350	809,519	59,103	1,128,751	27,240	723,099
	Other	-	4,682	-	-	3,716	6,520
		147,911	6,528,849	260,277	5,708,113	454,698	5,809,353
Mpls./St. Paul	Corn	1,404,301	284,216	2,184,914	165,646	2,507,992	144,256
	Soybeans	309,958	14,564	288,374	32,463	870,649	211,369
	Other	-	-	-	-	12,464	-
		1,714,259	298,780	2,473,288	198,109	3,391,105	355,625
Duluth/Superior	Corn	295,549	4,515	855,490	-	27,091	-
	Soybeans	9,756	-	354,865	-	175,162	-
	Other	5,657	-	-	-	-	-
		310,962	4,515	1,210,355	-	202,253	-
Other points 2/	Corn	154,431	37,347	315,491	139,316	281,670	386,108
	Soybeans	22,788	-	-	39,669	-	29,258
		177,219	37,347	315,491	178,985	281,670	415,366
Total Minnesota	Corn	1,978,842	7,674,627	3,561,099	6,653,619	3,240,495	7,779,466
	Soybeans	940,068	3,210,126	1,158,304	3,217,288	1,628,475	2,727,705
	Other	5,657	139,097	-	109,420	29,885	168,399
		2,924,567	11,023,850	4,719,403	9,980,327	4,898,855	10,675,570
Iowa points 3/	Corn	161,137	12,190	81,542	504	310,218	4,100
	Soybeans	5,931	92,818	51,772	-	165,556	756
	Other	-	-	6,443	-	-	-
		167,068	105,008	139,757	504	475,774	4,856
Illinois points	Corn	-	-	19,781	-	-	1,672
	Soybeans	16,417	-	51,069	-	-	-
		16,417	-	70,850	-	-	1,672
Missouri points	Corn	20,348	-	41,844	-	184,892	-
	Soybeans	61,578	-	51,111	-	175,621	-
		81,926	-	96,955	-	360,513	-
Wisconsin	Corn	-	-	4,634	25,468	-	14,410
		-	-	4,634	25,468	-	14,410
Gulf 4/	Corn	353,048	-	65,126	-	-	-
	Soybeans	320,745	-	62,560	-	-	-
		673,793	-	127,686	-	-	-
Unknown	Corn	185,750	469,976	432,064	631,352	159,530	1,512
	Soybeans	4,000	544,912	-	369,454	28,200	129,047
		189,750	1,014,888	432,064	1,000,806	187,730	130,559
Total all	Corn	2,699,125	8,156,793	4,206,090	7,310,943	3,895,135	7,801,160
	Soybeans	1,348,739	3,847,856	1,378,816	3,586,742	1,997,852	2,857,508
	Other	5,657	139,097	6,443	109,420	29,885	168,399
		4,053,521	12,143,746	5,591,349	11,007,105	5,922,872	10,827,067

1/ One cooperative furnished data for only 5 months of 1970-71.

2/ Includes Red Wing, Spring Valley, Cannon Falls, and Winona.

3/ Includes Des Moines, Belmond, Cedar Rapids, Dubuque, Davenport, and Clinton.

4/ Includes Baton Rouge, Reserve, New Orleans, Westwego, Destrehan, La.; Houston and Beaumont, Texas.

Table 11 -- Percent of grain shipments by months for 11 cooperatives, South Central Minnesota, 1972.

Month	Corn	Soybeans	Total grain
	<u>Percent</u>		
January	4	6	5
February	4	8	5
March	4	9	5
April	4	10	6
May	5	5	5
June	10	7	9
July	13	9	12
August	15	5	12
September	11	2	8
October	9	21	13
November	14	10	13
December	<u>7</u>	<u>8</u>	<u>7</u>
Total	100	100	100

Table 12--Model A and B: Estimated operating expenses at various volume levels for first year's operation of a 300,000-bushel concrete elevator costing \$496,000, 1/ 10-year repayment, 1973

Expenses	Volume in 1,000 bushels per year		
	2,200	3,000	4,500
Operating expenses: <u>2</u> /			
Salaries and labor <u>3</u> /	\$66,100	\$69,600	\$77,900
Interest--grain <u>4</u> /	19,800	19,800	19,800
Interest--facility <u>5</u> /	40,900	40,900	40,900
Depreciation <u>6</u> /	23,600	23,600	23,600
General and administrative <u>7</u> /	<u>33,900</u>	<u>37,700</u>	<u>45,400</u>
Total	184,300	191,600	207,600
Total expenses per bushel (cents)	8.4	6.4	4.6

1/ Does not include cost of railroad siding.

2/ All operating expenses are rounded to the nearest \$100.

3/ Includes fringe benefits--social security, retirement, hospitalization, unemployment, and workmen's compensation.

4/ Interest on seasonal loan based on rate of $8\frac{1}{2}$ percent with automatic adjustment clause.

5/ Long-term interest on facilities is calculated at $8\frac{1}{2}$ percent with automatic adjustment clause.

6/ Facility depreciated at $2\frac{1}{2}$ percent and equipment at 10 percent.

7/ Includes repairs, maintenance, utilities, dryer fuel, insurance--grain, facilities--telephone, office supplies, plant supplies, advertising, insect control, travel, meetings, legal, accounting, auditing, directors' fees, dues, subscriptions, bank service charge, property taxes, bonds, licenses and miscellaneous.

Table 13--Model A: Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation after constructing a 300,000-bushel concrete elevator costing \$496,000 and rail siding for 25 cars costing \$90,000, 10 year loan, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying 1/	44,000	60,000	90,000	44,000	60,000	90,000
Other 2/	15,400	21,000	31,500	15,400	21,000	31,500
Total	169,400	231,000	337,500	213,400	291,000	427,500
Operating expenses:						
Elevator operation	184,300	191,600	207,600	184,300	191,600	207,600
Siding costs 3/	11,900	11,900	11,900	11,900	11,900	11,900
Total	196,200	203,500	219,500	196,200	203,500	219,500
Net saving (loss)	(26,800)	27,500	118,000	17,200	87,500	208,000
Repayment ability:						
Net savings (loss)	(26,800)	27,500	118,000	17,200	87,500	208,000
Add: Depreciation	28,100	28,100	28,100	28,100	28,100	28,100
Less: Cash patronage refund 4/	---	5,500	23,600	3,400	17,500	41,600
Available for loan repayment	1,300	50,100	122,500	41,900	98,100	194,500
Loan obligation:						
Principal-facility 5/	49,600	49,600	49,600	49,600	49,600	49,600
Principal-rail siding 5/	9,000	9,000	9,000	9,000	9,000	9,000
Class "C" stock 6/	6,800	6,800	6,800	6,800	6,800	6,800
Total	65,400	65,400	65,400	65,400	65,400	65,400
Over (under) loan	\$ (64,100)	\$ (15,300)	\$ 57,100	\$ (23,500)	\$ 32,700	\$ 129,100
	-----Percent-----					
I.R.R. 7/	3.6	13.8	30.0	12.9	24.8	45.8

Table 14--Model B: Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation after constructing a 300,000-bushel concrete elevator costing \$496,000 and rail siding for 50 cars costing \$165,000, 10 year loan, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying 1/	44,000	60,000	90,000	44,000	60,000	90,000
Other 2/	15,400	21,000	31,500	15,400	21,000	31,500
Total	169,400	231,000	346,500	213,400	291,000	436,500
Operating expenses:						
Elevator operation	184,300	191,600	207,600	184,300	191,600	207,600
Siding costs 3/	21,900	21,900	21,900	21,900	21,900	21,900
Total	206,200	213,500	229,500	206,200	213,500	229,500
Net saving (loss)	(36,800)	17,500	117,000	7,200	77,500	207,000
Repayment ability:						
Net savings (loss)	(36,800)	17,500	117,000	7,200	77,500	207,000
Add: Depreciation	31,800	31,800	31,800	31,800	31,800	31,800
Less: Cash patronage refund 4/	---	3,500	23,400	1,400	15,500	41,400
Available for loan repayment	(5,000)	45,800	125,400	37,600	93,800	197,400
Loan obligation:						
Principal-facility 5/	49,600	49,600	49,600	49,600	49,600	49,600
Principal-rail siding 5/	16,500	16,500	16,500	16,500	16,500	16,500
Class "C" stock 6/	7,400	7,400	7,400	7,400	7,400	7,400
Total	73,500	73,500	73,500	73,500	73,500	73,500
Over (under) loan	\$ (78,500)	\$ (27,700)	\$ 51,900	\$ (35,900)	\$ 20,300	\$ 123,900
	-----Percent-----					
I.R.R. 7/	2.9	12.4	27.0	11.5	22.3	41.2

Note: All amounts rounded to nearest \$100.

1/ Drying income based on 2 cents a bushel of volume handled.

2/ Other income based on refund by railroad (See page 10).

3/ See page 9.

4/ Paid cash patronage refund of 20 percent of net savings.

5/ Assume 10 percent of term loan paid each year.

6/ Represents a 10-percent interest override invested in Class "C" stock of the Bank for Cooperatives (based on seasonal and facility interest paid).

7/ Internal rate of return (IRR) is based on net revenue (total revenue minus operating expenses) for the life of the project. In this case, 31 years was used. IRR is the compound interest expression of the earning rate of capital over the operating life of the project.

Table 15 --Model Y and Z: Estimated operating expenses at various volume levels for first year's operation of a 500,000-bushel concrete elevator costing \$624,000, 1/ 10-year repayment, 1973

Expenses	Volume in 1,000 bushels per year		
	2,200	3,000	4,500
Operating expenses: <u>2/</u>			
Salaries and labor <u>3/</u>	\$66,100	\$69,600	\$77,900
Interest--grain <u>4/</u>	33,000	33,000	33,000
Interest--facility <u>5/</u>	51,500	51,500	51,500
Depreciation <u>6/</u>	30,100	30,100	30,100
General and administrative <u>7/</u>	<u>37,200</u>	<u>41,000</u>	<u>48,700</u>
Total	217,900	225,200	241,200
Total expenses per bushel (cénts)	9.9	7.5	5.4

1/ Does not include cost of railroad siding.

2/ All operating expenses are rounded to the nearest \$100.

3/ Includes fringe benefits--social security, retirement, hospitalization, unemployment, and workmen's compensation.

4/ Interest on seasonal loan based on rate of $8\frac{1}{2}$ percent with automatic adjustment clause.

5/ Long-term interest on facilities is calculated at $8\frac{1}{2}$ percent with automatic adjustment clause.

6/ Facility depreciated at $2\frac{1}{2}$ percent and equipment at 10 percent.

7/ Includes repairs, maintenance, utilities, dryer fuel, insurance--grain, facilities--telephone, office supplies, plant supplies, advertising, insect control, travel, meetings, legal, accounting, auditing, directors' fees, dues, subscriptions, bank service charge, property taxes, bonds, licenses and miscellaneous.

Table 16--Model Y: Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation after constructing a 500,000-bushel concrete elevator costing \$624,000 and rail siding for 25 cars costing \$90,000, 10 year loan, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying <u>1/</u>	44,000	60,000	90,000	44,000	60,000	90,000
Other <u>2/</u>	15,400	21,000	22,500	15,400	21,000	22,500
Total	169,400	231,000	337,500	213,400	291,000	427,500
Operating expenses:						
Elevator operation	217,900	225,200	241,200	217,900	225,200	241,200
Siding costs <u>3/</u>	11,900	11,900	11,900	11,900	11,900	11,900
Total	229,800	237,100	253,100	229,800	237,100	253,100
Net saving (loss)	(60,400)	(6,100)	84,400	(16,400)	53,900	174,400
Repayment ability:						
Net savings (loss)	(60,400)	(6,100)	84,400	(16,400)	53,900	174,400
Add: Depreciation	34,600	34,600	34,600	34,600	34,600	34,600
Less: Cash patronage refund <u>4/</u>	---	---	18,700	---	11,000	36,700
Available for loan repayment	(25,800)	28,500	100,300	18,200	77,500	172,300
Loan obligation:						
Principal-facility <u>5/</u>	62,400	62,400	62,400	62,400	62,400	62,400
Principal-rail siding <u>5/</u>	9,000	9,000	9,000	9,000	9,000	9,000
Class "C" stock <u>6/</u>	9,200	9,200	9,200	9,200	9,200	9,200
Total	80,600	80,600	80,600	80,600	80,600	80,600
Over (under) loan	\$ (106,400)	\$ (52,100)	\$ 19,700	\$ (62,400)	\$ (3,100)	\$ 91,700
	-----Percent-----					
I.R.R. <u>7/</u>	-2.7	7.8	21.8	7.0	17.4	34.9

Table 17--Model Z: Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation after constructing a 500,000-bushel concrete elevator costing \$624,000 and rail siding for 50 cars costing \$165,000, 10 year loan, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying <u>1/</u>	44,000	60,000	90,000	44,000	60,000	90,000
Other <u>2/</u>	15,400	21,000	31,500	15,400	21,000	31,500
Total	169,400	231,000	346,500	213,400	291,000	436,500
Operating expenses:						
Elevator operation	217,900	225,200	241,200	217,900	225,200	241,200
Siding costs <u>3/</u>	21,900	21,900	21,900	21,900	21,900	21,900
Total	239,800	247,100	263,100	239,800	247,100	263,100
Net saving (loss)	(70,400)	(16,100)	83,400	(26,400)	43,900	173,400
Repayment ability:						
Net savings (loss)	(70,400)	(16,100)	83,400	(26,400)	43,900	173,400
Add: Depreciation	38,400	38,400	38,400	38,400	38,400	38,400
Less: Cash patronage refund <u>4/</u>	---	---	16,700	---	8,800	34,700
Available for loan repayment	(32,000)	22,300	105,100	12,000	73,500	177,100
Loan obligation:						
Principal-facility <u>5/</u>	62,400	62,400	62,400	62,400	62,400	62,400
Principal-rail siding <u>5/</u>	16,500	16,500	16,500	16,500	16,500	16,500
Class "C" stock <u>6/</u>	9,800	9,800	9,800	9,800	9,800	9,800
Total	88,700	88,700	88,700	88,700	88,700	88,700
Over (under) loan	\$ (120,700)	\$ (66,400)	\$ 16,400	\$ (76,700)	\$ (15,200)	\$ 88,400
	-----Percent-----					
I.R.R. <u>7/</u>	-3.0	7.0	20.0	6.2	15.9	32.2

Note: All amounts rounded to nearest \$100.

1/ Drying income based on 2 cents a bushel of volume handled.

2/ Other income based on refund by railroad (See page 10).

3/ See page 9.

4/ Paid cash patronage refund of 20 percent of net savings.

5/ Assume 10 percent of term loan paid each year.

6/ Represents a 10-percent interest override invested in Class "C" stock of the Bank for Cooperatives (based on seasonal and facility interest paid).

7/ Internal rate of return (IRR) is based on net revenue (total revenue minus operating expenses) for the life of the project. In this case, 31 years was used. IRR is the compound interest expression of the earning rate of capital over the operating life of the project.

Table 18--Added facilities--Estimated operating expenses at various volume levels for first year's operation of a 300,000-bushel concrete annex costing \$215,000, 10 year repayment, 1973

Expenses	Volume in 1,000 bushels per year		
	2,200	3,000	4,500
Operating expenses			
Salaries and labor <u>1/</u>	\$23,600	\$27,700	\$31,900
Depreciation <u>2/</u>	6,400	6,400	6,400
Interest--seasonal <u>3/</u>	19,800	19,800	19,800
Interest--facilities <u>4/</u>	17,700	17,700	17,700
General & administrative <u>5/</u>	<u>15,200</u>	<u>17,100</u>	<u>20,900</u>
Total	82,700	88,700	96,700

Note: Covers only the cost of added storage. In some cases handling equipment may need to be expanded. This added cost could range from \$75,000 to \$200,000 depending on the additional handling equipment and modifications needed by the individual elevator.

1/ Includes fringe benefits--social security, retirement, hospitalization, unemployment, and workmen's compensation.

2/ Facility depreciated at $2\frac{1}{2}$ percent and equipment at 10 percent.

3/ Interest on seasonal loan based on rate of $8\frac{1}{4}$ percent with automatic adjustment clause.

4/ Interest on facilities is calculated at $8\frac{1}{4}$ percent with automatic clause.

5/ Includes repairs, maintenance, utilities, (excludes dryer fuel), insurance --grain, facilities--telephone, office supplies, plant supplies, advertising, insect control, travel, meetings, legal, accounting, auditing, directors' fees, dues, subscriptions, bank service charge, property taxes, bonds, licenses and miscellaneous.

Table 19--Added facilities--Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation for a 300,000 bushel concrete annex costing \$215,000 and rail siding for 25 cars costing \$90,000, 10 year repayment, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying <u>1/</u>	44,000	60,000	90,000	44,000	60,000	90,000
Other <u>2/</u>	15,400	21,000	22,500	15,400	21,000	22,500
Total	169,400	231,000	337,500	213,400	291,000	427,500
Operating expenses:						
Elevator operation	82,700	88,700	96,700	82,700	88,700	96,700
Siding costs <u>3/</u>	11,900	11,900	11,900	11,900	11,900	11,900
Total	94,600	100,600	108,600	94,600	100,600	108,600
Net saving (loss)	74,800	130,400	228,900	118,800	190,400	318,900
Repayment ability:						
Net savings (loss)	74,800	130,400	228,900	118,800	190,400	318,900
Add: Depreciation	10,900	10,900	10,900	10,900	10,900	10,900
Less: Cash patronage refund <u>4/</u>	15,000	26,100	45,800	23,800	38,100	63,800
Available for loan repayment	70,700	115,200	194,000	105,900	163,200	266,000
Loan obligation:						
Principal-facility <u>5/</u>	21,500	21,500	21,500	21,500	21,500	21,500
Principal-rail siding <u>5/</u>	9,000	9,000	9,000	9,000	9,000	9,000
Class "C" stock <u>6/</u>	4,500	4,500	4,500	4,500	4,500	4,500
Total	35,000	35,000	35,000	35,000	35,000	35,000
Over (under) loan	\$35,700	\$80,200	\$159,000	\$70,900	\$128,200	\$231,000

Table 20--Added facilities--Margins 5¢ and 7¢: Pro forma income statement and repayment ability at various volume levels for first year's operation for a 300,000 bushel concrete annex costing \$215,000 and rail siding for 50 cars costing \$165,000, 10 year repayment, 1973.

Item	Margin 5¢/bu.			Margin 7¢/bu.		
Volume handled (1,000 bu.)	2,200	3,000	4,500	2,200	3,000	4,500
Income:						
Merchandising	\$110,000	\$150,000	\$225,000	\$154,000	\$210,000	\$315,000
Drying <u>1/</u>	44,000	60,000	90,000	44,000	60,000	90,000
Other <u>2/</u>	15,400	21,000	31,500	15,400	21,000	31,500
Total	169,400	231,000	346,500	213,400	291,000	436,500
Operating expenses:						
Elevator operation	82,700	88,700	96,700	82,700	88,700	96,700
Siding costs <u>3/</u>	21,900	21,900	21,900	21,900	21,900	21,900
Total	104,600	110,600	118,600	104,600	110,600	118,600
Net saving (loss)	64,800	120,400	227,900	108,800	180,400	317,900
Repayment ability:						
Net savings (loss)	64,800	120,400	227,900	108,800	180,400	317,900
Add: Depreciation	14,600	14,600	14,600	14,600	14,600	14,600
Less: Cash patronage refund <u>4/</u>	13,000	24,100	45,600	21,800	36,100	63,600
Available for loan repayment	66,400	110,900	196,900	101,600	158,900	268,900
Loan obligation:						
Principal-facility <u>5/</u>	21,500	21,500	21,500	21,500	21,500	21,500
Principal-rail siding <u>5/</u>	16,500	16,500	16,500	16,500	16,500	16,500
Class "C" stock <u>6/</u>	5,100	5,100	5,100	5,100	5,100	5,100
Total	43,100	43,100	43,100	43,100	43,100	43,100
Over (under) loan	\$23,300	\$67,800	\$153,800	\$58,500	\$115,800	\$225,800

Note: See note at bottom of table 18 regarding possible additional handling facility costs.

1/ Drying income based on 2 cents a bushel of volume handled.

2/ Other income based on refund by railroad (See page 10).

3/ See page 9.

4/ Paid cash patronage refund of 20 percent of net savings.

5/ Assume 10 percent of term loan paid each year.

6/ Represents a 10-percent interest override invested in Class "C" stock of the Bank for Cooperatives (based on seasonal and facility interest paid).

